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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,962	09/16/2005	Charles F Kutscher	NREL 03-17	8369
Paul J White NREL 1617 Cole Boulevard Golden, CO 80401				
7550 10/03/2008			EXAMINER DUONG, THO V	
			ART UNIT 3744	PAPER NUMBER
			MAIL DATE 10/03/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/549,962

Applicant(s)

KUTSCHER ET AL.

Examiner

Tho v. Duong

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-29, 32, 33, 35-37, 50-61 and 63-65 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-29, 32, 33, 35-37, 50-61 and 63-65 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/10/08 has been entered.

Response to Arguments

Applicant's arguments filed 7/10/08 have been fully considered but they are not persuasive. Regarding claims 18,19,20,23-26,32,33 and 35, applicant's argument that the Schulze fails to disclose that 50 percent of tabs extend from the first surface and 50 percent extend from the second surface, has been very carefully considered but is not found to be persuasive. Applicant is reminded that the limitation must be interpreted as broadly as it reasonably allows. Therefore, the upper surface (above line RLE) of Schulze (figure 2) is considered to read on the first surface and the lower surface (below line RLE) of Schulze is considered to read on the second surface, wherein 50 percent of the tabs (3) extend from the first surface and the other 50 percent of the tabs extend from the second surface. Regarding claim 32, applicant's argument that Schulze fails to disclose a minority of tabs proximate to the tube is at an angle relative to a majority of the tabs. As cited in the last previous Office action, a minority of the tabs located on the upper surface and closest to the tube, are arranged at an angle with the majority of the tabs located on the lower surface of the fin. Regarding claim 50, applicant's argument that Schulze fails to disclose that the tabs are parallel to the local flow paths, Has been

very carefully considered but is not found to be persuasive. The local flow path is broadly interpreted as the flow paths that air flows along the wall portion of the tabs. Therefore, the tabs are considered to be parallel with the local flow path.

Regarding references to Yun in view of Gunter, applicant's argument that a side of the slit body can not be read as a tab since the entire slit body will effect flow and create a much different heat transfer environment, has been very care fully considered but is not found to be persuasive since a side of the slit is structurally read on the tab, wherein one side of the slit attached to a fin body and another side distal and not attached to the fin body. Applicant's further argument that Gunter does not disclose a curved shoulder, has been very carefully considered but is not found to be persuasive. Applicant is advised to see figure 4 of Gunter, which shows that the tab (side wall) that has a curved shoulder connected to its top wall. Regarding claim 23, applicant's argument that Yun fails to disclose tabs to be less densely distributed in the wake region and distal to the leading edge of fin (10), has been very carefully considered but is not found to be persuasive. The wake region is interpreted as the region locate near the end of the tube (20), wherein there is only one tab located in the region. Regarding claims 24 and 26, Yun discloses (figure 6) that in each row one tab (side wall) extends from a first heat transfer surface and the other tab extend from a second heat transfer surface area. Regarding claim 26, the side wall of the slit (12a) are considered to read on the claimed tabs that have offset angle (θ_1) of less than 10 degrees, and the tabs in the adjacent rows are not coplanar. Regarding claim 28, the offset angles differ for at least some of the tabs and the offset angles are selected to position the tab bodies substantially parallel with a plurality of

predetermined local flow paths, wherein the local flow paths are the paths that air flow along the tabs.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

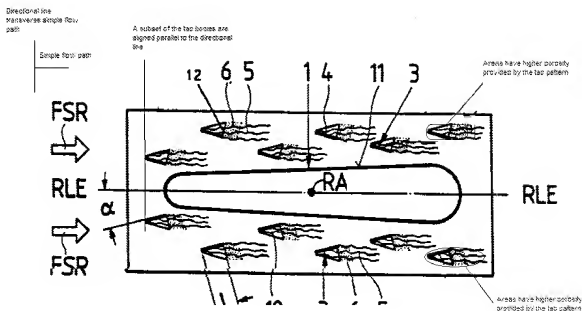
Claims 18-20,23-26,32,33,35,37 and 50-52,54-61 and 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schulze et al. (US 4,997,036) in view of Liu et al. (US 6,349,761). Schulze discloses (figures 1-2) a fin comprising a metallic fin body (2) with a first and second heat transfer surface (upper and lower surface area of line RLE) and a leading edge; a plurality of tabs (3) bent at an angle 90 degrees from the first and second heat transfer surfaces, wherein each of the tab bodies (3) comprises a substantially planar body with a first end attached to the fin body and a second end distal and unattached to the fin body and wherein the tab bodies are positioned at offset angles, the offset angles for substantially all of the tabs being less than about 20 degrees; there are about 50 percent of the tabs extend from the upper heat transfer surface. Regarding claim 23, Schulze discloses that the tabs (3) are spaced further apart at its rear than its front such that the tabs are less densely distributed in a wake region. Regarding claim 24, the tabs (3) are arranged in rows relative to the leading edge, and wherein in each of the rows a first portion of the tabs extend from the upper heat transfer surface and a second portion of the tabs extend from the lower heat transfer surface, whereby adjacent ones of the tabs

in each of the rows extend from different ones of the first and second heat transfer surfaces.

regarding claims 25 and 26, each of the tabs (3) extending from a same one of the heat transfer surface area in each of the rows is offset an offset distance relative to corresponding ones of the tabs in adjacent rows, wherein the adjacent ones of the rows are offset relative to each other such that the tabs in the adjacent rows are not coplanar. Regarding claim 32, a minority of tabs on the upper surface being proximal to the tube (tabs closest to the tube) are aligned at an angle relative to the majority of tabs in the lower surface so that gas flowing over the fin body around the tube. Regarding claim 33, the tabs (3) are positioned adjacent the tube to disrupt heat conduction pathways in the fin body that extend substantially parallel to the leading edge away from the tube. Regarding claim 35, a subset of the tabs (3) are positioned at offset angle greater than 20 degrees (relative to the leading edge of the fin) to generate turbulent in airflow across the fin body. Regarding claim 37, at least portion of the first heat transfer surface of the fin body has a surface treatment (surface equipped with tabs) to promote turbulence adjacent the surface treated portion. Regarding claim 50, the tabs located in the upper heat transfer surface or in the lower heat transfer surface that are arranged with a leading edge proximate to the leading edge of the fin body and substantially parallel to local flow paths flowing between the tabs. Regarding claim 53, the tab body (3) has a larger percentage of the tab body surface area located proximate to the fin body (the bottom part it wider than the top part). Regarding claim 55, the tab body has a L-shaped cross section since the tab body is bent at 90 degrees from the heat transfer surface area.

Schulze does not disclose tube collars for receiving the tubes. Liu discloses (figure 1) that the fin body has tube collars for a purpose of securing the tube to the fin body. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Liu's

teaching in Schulze's device for a purpose of securing the tube to the fin body. Regarding claim 57, the surface porosity is interpreted as the opening over a certain area of fin. Figure A discloses that the surface porosity appears to be within 10 to 40% and the fin has areas of higher porosity shown (circled one). Regarding claim 59, a minority of the tabs are aligned at an angle greater than 5 degrees relative to the flow path (FSR). Regarding claim 61, Schulze discloses a majority of the tabs are aligned substantially perpendicular to the leading edge. Regarding claim 56, 63 and 64, Schulze disclose (figure 4) that the fin body has first and second side (upper and lower surface) and the tab pattern is selected such that the tab bodies only extend from the upper side and the tab bodies has a tab height (middle portion) measured from the first or the second side of the fin body from which the tab extends, the tab height at the middle being less than or about 50% a fin separation distance (H).



Claims 18-29,32-33, 35,37 and 50-52 and 54-61 and 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al. (US 5,697,432) in view of A. Y. Gunter (US 3,438,433). Yun discloses (figures 2 and 4-10) a fin comprising a metallic fin body with first and second heat transfer surfaces and a leading edge; tubes receiving in the fin; a plurality of tabs (11) extending at a bend angle from the first and second heat transfer surfaces, wherein each of the tabs comprises a substantially planar body (side body) and wherein the tab bodies are positioned at offset angles; the offset angles (θ_1) being less than about 10 degrees as measured from a simple flow path extending across the fin body substantially perpendicular to the leading edge of the fin body; the offset angles of less than 20 degrees are for substantially all of the tabs at (12a); the bend angle is between about 70 and about 110 degrees as measured from the first or the second heat transfer surface area; the tabs have a height as measured from the first or second heat transfer surface that is less than about two thirds of the predetermined fin separation distance for the heat exchanger; the tabs are about 50% of the tabs extend from the first heat transfer surface. Regarding claim 23, Yun disclose tabs to be less densely distributed in the wake region and distal to the leading edge of fin (10), the wake region is interpreted as the region locate near the end of the tube (20), wherein there is only one tab located in the region. Regarding claims 24 and 26, Yun discloses (figure 6) that in each row one tab (side wall) extends from a first heat transfer surface and the other tab extend from a second heat transfer surface area. Regarding claim 26, the side wall of the slit (12a) are considered to read on the claimed tabs that have offset angle (θ_1) of less than 10 degrees, and the tabs in the adjacent rows are not coplanar. Regarding claim 28, the offset angles differ for at least some of the tabs and the offset angles are selected to position the tab bodies substantially parallel with a plurality of

predetermined local flow paths, wherein the local flow paths are the paths that air flow along the tabs. Regarding claim 35, and the tabs (side wall of tabs 12b) which are close to the rear of the collar are considered a subset that has an offset angles greater than 20 degree to generate turbulence in air flowing across the fin body. Regarding claim 37, at least portion of the first heat transfer surface of the fin body has a surface treatment (surface equipped with slits and raised portions) to promote turbulence adjacent the surface treated portion. Regarding claims 57-61 and 63-65, Yun discloses (figure B as shown bellow) the invention as claimed, wherein the tabs (11,12) having tab bodies being substantially planar with a subset of the fin body aligned parallel to a flow path; a subset of the tab bodies are aligned parallel to a directional line that is transverse to a simple flow path; a minority of the tabs (longest tab) are vortex generator and are aligned at an angle greater than 5 degrees relative to the predetermined flow paths; the minority of the tabs is positioned proximal to a wake region; the fin body includes a leading edge and a majority of the tabs are aligned substantially perpendicular to the leading edge. Regarding claim 63, the cross-hatched tabs of Yun is considered to read on the tab pattern, which only extend from the second side. Yun substantially discloses all of applicant claimed invention as discussed above except for the limitation of tube collars and the tab body has a partially curved shoulder at a leading edge. Gunter discloses (figures 1-4) a details of a tab body has a substantially planar body (side of the slit) wherein the tab has a partially curved shoulder at a leading edge for a purpose of forming a smooth transition between different portions of the tab; and tube collars (17) formed on the fin for a purpose of gripping the tube on the fins. It would have been obvious to one having ordinary skill in the art at the time the invention was made to

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use Gunter's teaching in Yun for a purpose of forming a smooth transition between different parts of the tabs and gripping the tube on the fins

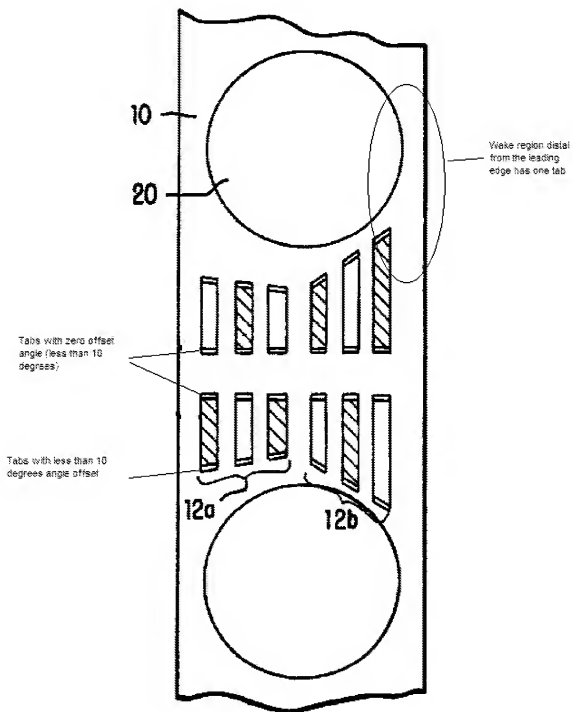


Figure A: The modified figure corresponds to figure 8 of Yun with limitations shown

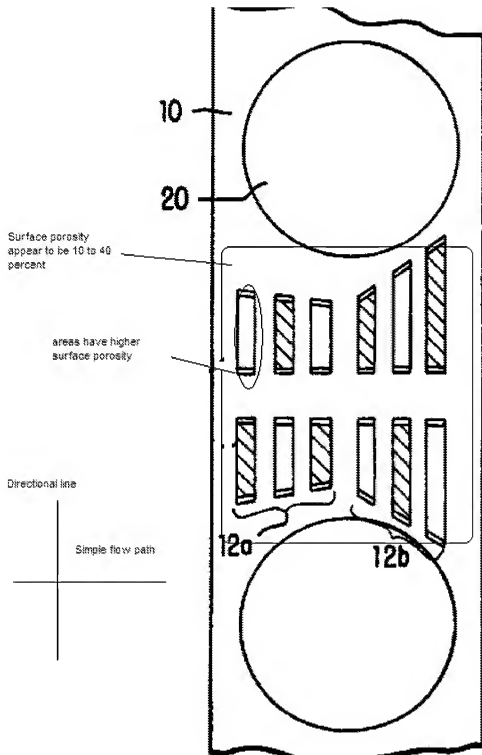


Figure B: The modified figure corresponds to figure 8 with limitation shown.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yun in view of Gunter or Schulze in view of Liu and further in view of Stoynoff, Jr. (US 5,682,784). Yun or Schulze substantially discloses all of applicant's claimed invention as discussed above except for the limitation that the tabs have a surface roughness greater than heat transfer surface area of the fin body. Stoynoff teaches of (figures 3-4,8 and column 2, lines 24-27) a fin a rough surface (30) on louver (32) of the fin body (34) for a purpose of promoting turbulence in an airflow to enhance the heat transfer of the fin. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Stoynoff's teaching in Yun's fin or Schulze's fin for a purpose of promoting turbulence in an airflow to enhance the heat transfer of the fin. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yun or Schulze in view of Relfe, J (DE 3918610A). Yun or Schulze substantially discloses all of applicant's claimed invention as discussed above except for the limitation that the heat transfer surface area is treated to promote turbulence. Relfe discloses (figures 1-2) a finned heat exchanger that has surface of the fin (1) being roughed up for a purpose of increasing exchange surface area and in addition creating turbulences in the air flow. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Stoynoff's teaching in Yun's device or Schulze for a purpose of increasing exchange surface area and in addition creating turbulences in the airflow.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tho v. Duong whose telephone number is 571-272-4793. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tyler J. Cheryl can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tho v Duong/
Primary Examiner, Art Unit 3744